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Review article

Society of Family Planning clinical guidelines pain control in surgical abortion part 1 — local anesthesia and minimal sedation

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ABSTRACT

Satisfactory pain control for women undergoing surgical abortion is important for patient comfort and satisfaction. Clinicians ought to be aware of the safety and efficacy of different pain control regimens. This document will focus on nonpharmacologic modalities to reduce pain and pharmacologic interventions up to the level of minimal sedation. For surgical abortion without intravenous medications, a multimodal approach to pain control may combine a dedicated emotional-support person, visual or auditory distraction, administration of local anesthesia to the cervix with buffered lidocaine and a preoperative nonsteroidal anti-inflammatory drug. Oral opioids do not decrease procedural pain. Oral anxiolytics decrease anxiety but not the experience of pain. Further research is needed on alternative options to control pain short of moderate or deep sedation.

Contents

Background

Pain experienced during an abortion procedure is influenced by a complex interplay of physical, psychological, social and medical factors [1]. Pain related to surgical abortion stems from stimulation of the sensory fibers that innervate the uterus and cervix. Impulses transmitted via neural pathways to the brain and spinal cord are interpreted as pain by the higher cortical centers. Sensation from the upper vagina, cervix and lower uterine segment carried by parasympathetic nerves from the sacral spine (S2 to S4) enters the uterus along the uterine blood vessels at about 3 o'clock and 9 o'clock. Sympathetic fibers from the thoracic and lumbar spine (T10 to L1) innervate the uterine fundus via the ovarian plexuses entering the cornua and at the uterosacral ligaments [2].

Pharmacologic pain management options for surgical abortion include local cervical anesthesia alone; oral (PO), intramuscular (IM) or intravenous (IV) medications; general anesthesia; or some combination thereof. These options form part of a continuum from no sedation to deep sedation monitored by anesthesiologists or specialists. The levels

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of sedation that have been developed and adopted by the American Society of Anesthesiologists allow for a standardized definition and guide provision of sedation and analgesia while minimizing associated risks [3]. The definition of minimal sedation is a single oral sedative or analgesic medication administered in doses appropriate for the unsupervised treatment of insomnia, anxiety or pain. Less than 50% inhaled nitrous oxide in oxygen with no other sedative or analgesic medications is considered minimal anesthesia. Safety, effectiveness, side-effect profile, cost, patient preference, facility and personnel resources, governmental regulations, training, and provider choice or bias influence the choice of anesthesia or analgesia [4]. As of 2002, only 21% of National Abortion Federation member clinics offered deep IV sedation or general anesthesia, while 33% offered local anesthesia with IV sedation and 46% offered local anesthesia only, with or without oral sedation [5].

The objective measurement of pain in research studies and clinical care is challenging. Both numeric scales such as the visual analog scale (VAS) or numeric rating scale (NRS) and descriptive categories have been used [6]. The VAS, a continuous scale made up of a 10-cm (100-mm) line, is anchored by "no pain" at one end and "worst pain imaginable" at the other. Subjects complete the assessment by marking a line perpendicular to the VAS line at the point that represents their pain intensity. Similarly, the NRS is marked with numbers from 0 to 10, and subjects select the whole number that best reflects the intensity of their pain. This 11-point scale can be modified by providing participants with half numbers between the whole numbers, offering 21 points to report pain. Most human beings do not discriminate among more than 21 levels of pain [7]. Verbal rating scales (VRS) consist of categorical variables such as none, mild, moderate or severe pain, which generally correspond to the NRS as follows: none=0, mild=1–3, moderate=4–6 and severe=7–10. There are multiple variations of the NRS and VRS. When comparing interventions to reduce pain, the clinically significant difference in acute pain scores is debated [8]. Most researchers consider a difference of 1.5–2.0 cm on the VAS or a difference of 1.5–2.0 points on the NRS as clinically significant [9,10]. While pain scores are often not normally distributed, many researchers report both means and medians to allow for comparisons between studies.

This guideline will focus on nonpharmacologic techniques as well as local anesthesia and minimal sedation options for pain control for surgical abortion.

Clinical questions

1. *What characteristics are associated with the experience of pain, and what can patients expect?*

   The experience of pain is influenced not only by physical factors but also by psychological and social factors [1,11]. Some of these factors may be modifiable (e.g., anxiety) and others not (e.g., parity). Knowledge of these characteristics may help the provider anticipate patient needs during the procedure. Anxiety, depression and a woman's anticipation of the pain are strong predictors of the pain she perceives during surgical abortion [12–16]. An older study found that ambivalence and moral dilemma about the abortion decision were associated with increased pain [14], while a contemporary study did not [16]. Nulliparity is associated with increased pain, while prior vaginal birth is associated with decreased pain [14,15,17]. Prior abortion does not measurably change the pain experience [15]. Some, but not all, studies have found that young patient age, retroverted uterus, history of dysmenorrhea and gestational age (≤7 weeks vs. ≥12 weeks) are predictors of increased pain [12,14,15,18].

   Several studies examining patients' experience of pain during first-trimester surgical abortion under local anesthesia report mean pain scores between 4 and 7 on a scale of 0–10 [16,19–21]. For descriptive categories, 1055 women reported the following levels of pain: 1.5%, none; 5.7%, hardly any; 14.2%, a little; 20.3%, medium; 31.7%, quite a bit; and 26.4%, severe [15]. In another evaluation, 2299 women reported the following levels of pain: 3%, none; 17%, mild; 46%, moderate; 32%, severe; and 2%, very severe [12]. These women also rated their abortion pain by comparing it to pain from other conditions: 71% rated abortion pain as more painful than menstrual pain, 63% as more painful than headache pain, but only 11% as more painful than labor pain. In another study that detailed the quality of abortion pain among 109 women, the sensory words of the McGill Pain Questionnaire chosen most often were beating, jumping, cramping, pulling and taut [14]. In this study, the pain during abortion was rated as less than labor pain but more than postherpetic neuralgia, toothache or arthritis. Preabortion counseling can reduce pain by decreasing fearfulness and anxiety [2,12]. Knowing what to expect before, during and after the procedure can empower women to manage their pain during the procedure.

2. *Does cervical preparation decrease pain from surgical abortion?*

   There is no evidence that cervical preparation with any modality decreases pain intraoperatively. Preoperative cramping and abdominal pain as well as vaginal bleeding occur more frequently in women exposed to osmotic dilators, misoprostol or mifepristone versus placebo [22–30]. Discomfort associated with cervical preparation is usually described as mild and not requiring analgesic agents [22,23,30–33]. Cervical preparation typically shortens operative time by reducing the need for mechanical dilation, but this does not always translate into lower pain being perceived by the patient, as was shown in one trial [23]. Furthermore, studies have shown that cervical priming with prostaglandin analogs can increase postoperative pain and the use of analgesics [25,34]. Continuing uterine contractions caused by the misoprostol may contribute to higher postoperative pain levels.

3. *What surgical techniques are associated with more or less pain?*

   Women tend to report more pain during longer procedures, particularly if such procedures are performed under local anesthesia alone [15]. While difficult to measure, providers likely affect the patient's pain experience through verbal conversation or procedural technique and skill [1,2,20,35]. Proficient providers performed procedures faster than trainees in one study, and patients perceived less pain during cervical dilation but not during uterine aspiration [20]. Atraumatic and single-tooth tenacula have similar pain scores as demonstrated in one randomized controlled trial (RCT) of 80 women comparing the standard single-tooth tenaculum and the atraumatic vulsellum tenaculum for intrauterine device (IUD) insertion (mean 3.5 cm vs. 3.5 cm, VAS; p=.58) [36].

   Studies yield conflicting information on the effect of source of suction (electric or manual) on the perception of pain, whether due to procedure time or noise of the electric suction [16,20,35,37,38]. Noise of electric suction will vary by whether the facility uses centralized suction (quieter) or a freestanding electric suction machine (noisier). Three U.S. RCTs comparing electric to manual suction found similar values for aspiration pain in procedures up to 10 or 11 weeks' gestation [16,20,35]. In one study of 84 women, most women (69%) noticed the noise of electric suction, but only 20% were "a little" or "somewhat" bothered by the noise and none were "very bothered" by it [35]. Pain scores were also similar between the two techniques in a meta-analysis of two trials of 383 women at up to 11 weeks' gestation, one from China and one from the United States [relative risk (RR), 0.78; 95% confidence interval (CI), 0.43–1.41] [37]. In contrast, a meta-analysis based on 800 women in four trials from China reported less severe pain with manual compared to electric suction in women undergoing procedures at less than 7 weeks' gestation (RR, 0.04; 95% CI, 0.01–0.12)

[37]. The majority of women find both procedure types to be acceptable, and satisfaction rates are high [35,38].

4. *What drugs can be used for local anesthesia?*

Ester local anesthetics (procaine, 2-chloroprocaine, tetracaine) and amide local anesthetics (lidocaine, bupivacaine) are options for cervical infiltration. While true allergies are extremely rare, the ester class is associated with more allergic reactions than the amide class because of the metabolite paraaminobenzoic acid [39]. Esters are hydrolyzed by plasma pseudocholinesterase, while amides are metabolized in the liver. The most common local anesthetics used in abortion care for cervical infiltration are amides, such as 0.5% or 1% lidocaine or 0.25% bupivacaine [2]. While bupivacaine has a longer duration of action than lidocaine (4–8 h vs. 1–2 h), disadvantages include more painful administration and higher risk of cardiotoxicity. The maximum dose of lidocaine without epinephrine should not exceed 4.5 mg/kg or 300 mg total [39,40]. A 200-mg lidocaine dose (20 mL of 1% lidocaine), often used for paracervical block (PCB), is well below the threshold of toxicity and is compatible with the drug label for lidocaine dosing in pregnancy [40]. At low serum levels of lidocaine, patients may experience tinnitus and circumoral numbness. Given the vascularity of the cervix, these symptoms are not uncommon during use of PCB in pregnant women [2]. At higher serum levels of lidocaine, patients may experience visual disturbances, confusion, seizure or cardiorespiratory arrest [39]. Techniques to lower the risk of lidocaine toxicity include adding vasopressin or epinephrine to reduce systemic absorption and aspirating before injecting to reduce the risk of intravascular instillation [2]. For patients with a true allergy to local anesthetics, other options include the use of bacteriostatic saline (containing 0.9% benzyl alcohol), use of a drug from the other class since there is no cross-reactivity or forgoing PCB entirely in favor of IV sedation [18,39,41].

5. *Is local anesthesia effective for pain control in surgical abortion?*

Women receiving local cervical anesthesia alone for first-trimester surgical abortion report, on average, experiencing moderate pain ranging from 4 to 7 out of 10 [19,42–46] compared to 8 to 9 out of 10 with sham local cervical anesthesia [21]. The PCB anesthetizes the nerve bundles lateral to the cervix at 3 o'clock and 9 o'clock as well as those within the uterosacral ligaments. In a randomized controlled trial of 120 women undergoing surgical abortion at less than 11 weeks [21], a PCB with 20 mL of 1% buffered lidocaine was compared to a sham PCB. In both arms, 2 mL of 1% buffered lidocaine was injected at the tenaculum site. The PCB consisted of 18 mL divided equally among four sites (2, 4, 8 and 10 o'clock) at the cervicovaginal junction. The injection was performed continuously from superficial to deep (3 cm) to superficial. The sham PCB consisted of a capped needle gently touching the vaginal sidewall. Three minutes elapsed before cervical dilation began. Women who received PCB reported significantly less pain with both dilation (mean 4.2 cm vs. 7.9 cm, VAS; $p<.001$) and aspiration (mean 6.3 cm vs. 8.9 cm, VAS; $p<.001$) than women in the sham group [21]. Satisfaction scores with pain control and the procedure were higher in the active PCB arm.

6. *What is the most effective method of administering local anesthesia?*

Tenaculum site anesthesia

Injected local anesthesia quickly and effectively reduces pain from tenaculum placement [47]. In an RCT among 70 women, 1% lidocaine, 2 mL, injected into the anterior lip of the cervix reduced pain more with tenaculum placement than 2% lidocaine gel, 1 mL, topical application (no waiting time) (mean 1.2 cm vs. 3.6 cm, VAS; $p<.001$) [48].

It is unclear if topical anesthetics are more effective if enough time is allowed to elapse prior to tenaculum placement or if higher doses are used. The product label for 2% lidocaine gel quotes 3–5 min for onset of action when used on mucosal surfaces [39]. However, one placebo-controlled study of 145 women undergoing IUD insertion showed no effect when waiting 3 min after 2% lidocaine gel for tenaculum placement [49]. Self-administration of topical anesthetics to the vagina does not require a speculum exam prior to the waiting period. One RCT of 59 women found that self-administration of 2% lidocaine gel, 4 mL, vaginally 5 min prior to IUD insertion resulted in lower pain scores for tenaculum placement compared to placebo gel (median 3.2 vs. 5.6, VAS; $p=.02$) [50]. On the basis of these data, investigators randomized 142 women undergoing first-trimester surgical abortion to PCB with 1% lidocaine, 12 mL (2 mL injected at the tenaculum site and the remainder divided between 4 o'clock and 8 o'clock), or 2% lidocaine gel, 20 mL, self-administered vaginally 20–30 min preprocedure [51]. All participants also received fentanyl 100 mcg IV and midazolam 1 mg IV. Pain with tenaculum placement was less with PCB (median, 2.4 cm for PCB vs. 3.7 cm for intravaginal gel, VAS; $p=.04$), but pain with cervical dilation was similar (median, 6.5 cm vs. 6.8 cm, VAS; $p=.45$).

PCB technique

Comparisons between studies of PCB are difficult because of varying injection amounts, locations and depths [4]. Nevertheless, neither the strength of the lidocaine (0.5% vs. 1%) nor the type of anesthetic (lidocaine vs. bupivacaine vs. ropivacaine) has been shown to substantially affect efficacy [42,52,53]. There is a trend toward lower pain in women receiving a 20-mL injection compared to 10-mL [19,54]. Sodium bicarbonate decreases the pain of injection by buffering the acidity of lidocaine (1 mL of 8.4% sodium bicarbonate for every 10 mL of anesthetic solution) [39]. PCB with buffered 2% lidocaine was slightly more effective at controlling pain from cervical dilation (mean, 4.4 vs. 5.2, 0–10 NRS; $p=.036$) than plain 2% lidocaine in an RCT of 167 women [54]. In another RCT, injection pain was lower with buffered 1% lidocaine than with plain 1% lidocaine (mean, 2.02 vs. 2.98, 0–10 NRS; $p=.004$), but procedure and postoperative pain was similar [42]. A slower injection (>60 s) was found to be associated with less injection pain than a fast injection (>30 s) in one study of 87 women (mean 1.38 vs. 2.00, 0–10 NRS; $p=.002$) [42] Deep paracervical injections (3 cm) have been found to be more effective than shallow injections (1.5 cm), although in one of the studies, use of different volume of lidocaine in the two arms may have confounded results (20 mL 1% lidocaine in the deep group vs. 10 mL 2% lidocaine in the shallow group) [4,54,55]. Among 40 women in one trial, pain scores during injection and aspiration were similar between a four-site (3, 5, 7 and 9 o'clock) and two-site (4 and 8 o'clock) paracervical injection (injection: mean 3.9 vs. 3.9, 0–10 NRS; $p=.37$ and aspiration: mean 6.2 vs. 6.3; $p=.94$) [18]. Similarly, in another RCT of 163 women, a four-site (2, 4, 8 and 10 o'clock) paracervical injection and a two-site (4 and 8 o'clock) paracervical injection were clinically equivalent for cervical dilation pain (mean 6.0 cm vs. 6.8 cm, VAS; $p=.03$) [56]. While one trial reported that waiting less than 2 min between block administration and procedure was associated with increased pain [17], other studies have not found that waiting 3 min decreases pain in a clinically significant manner [42,56,57].

Other techniques

An alternative to PCB involves injecting directly into the cervical stroma (intracervical). In two RCTs of women

undergoing first-trimester surgical abortion who also received moderate IV sedation (one study with 135 women and 1% lidocaine 5 mL two-point injection and one with 132 women and 1% buffered lidocaine 20 mL four-point injection), pain scores were similar between a shallow injection at the cervicovaginal junction and a deeper 3-cm injection into the cervical stroma [58,59]. Another method of delivering a local anesthetic to the cervix and uterus is an intrauterine infusion. Ideally, this method should block nerves innervating the uterine cavity that PCB cannot access. In an RCT of 80 women, 1% lidocaine 10-mL intrauterine infusion plus a 1% lidocaine 10-mL PCB did not achieve better pain control with cervical dilation or aspiration than the same PCB with intrauterine placebo [60]. A subsequent RCT among 80 women showed that a 5-mL 4% intrauterine lidocaine infusion plus a 10-mL 1% lidocaine PCB was more effective in decreasing pain with dilation (3.5 cm vs. 5.5 cm, VAS; $p<.01$) and aspiration (4.3 cm vs. 7.1 cm; $p<.01$) than the same PCB plus an intrauterine placebo [61]. While no women developed lidocaine toxicity with the dose of 300 mg, almost half reported numbness, tingling and ear ringing. The authors concluded that more safety studies should be performed before introducing this technique into routine clinical practice.

A few studies have evaluated the efficacy of 10% lidocaine spray as an adjunct to PCB. Overall, the data are not compelling since one study showing a marked difference had several flaws [62] and another showed minimal benefit [63]. One nonrandomized trial of 77 women at less than 8 weeks' gestation compared the addition of 10% lidocaine spray, 2 pumps (20 mg), to the cervix and upper vagina 2 min prior to the application of a 2% lidocaine 4-mL (80 mg) PCB to use of saline spray and the same PCB [62]. Thirty minutes postoperatively, subjects reported their intraoperative pain as lower in the lidocaine versus saline spray group (2.3 cm vs. 6.5 cm, VAS; $p<.001$). Aksoy and colleagues randomized 108 women at less than 7 weeks' gestation to four groups: (1) PCB [2% lidocaine, 4 mL (80 mg), with epinephrine] plus 10% lidocaine spray, 2 pumps (20 mg), to the cervix and vagina; (2) PCB with lidocaine plus placebo spray; (3) PCB with saline plus lidocaine spray and (4) PCB with saline plus saline spray [63]. The lidocaine/placebo spray was administered 2 min prior to the PCB. Median pain scores during the procedure were 4 cm for group 1, 5 cm for group 2, 5 cm for group 3 and 8 cm for group 4 (VAS; $p<.001$).

7. *What is the role of nonsteroidal anti-inflammatory drugs (NSAIDs) for pain control in surgical abortion?*

   Studies spanning several decades have evaluated the use of NSAIDs such as ketorolac, ibuprofen, naproxen and diclofenac sodium for intraoperative and postoperative surgical abortion procedural pain, alone and with local anesthesia. Oral, intramuscular, intracervical and intravenous routes have been studied.

   Two older studies have assessed the effect of preoperative NSAIDs on pain in women having an abortion under local anesthesia, and both studies showed a beneficial effect on pain perception. A study by Wiebe et al. randomized 193 women and found that ibuprofen 600 mg PO given 30 min preoperatively showed modestly better pain control than a placebo during aspiration and postoperatively [42]. In another RCT of 137 women, naproxen 550 mg PO given 1–2 h preoperatively resulted in better intraoperative ($p\leq.001$) and postoperative pain management at 15 ($p\leq.0001$) and 30 ($p\leq.002$) min than placebo or no medication [64].

   An RCT of 50 women undergoing first-trimester abortion at less than 11 weeks' gestation compared ibuprofen 600 mg PO and 1% lidocaine PCB to a combination of ketorolac 30 mg intracervical and 1% lidocaine PCB; both groups received lorazepam 2 mg sublingually. Women reported less pain during cervical dilation with the combined ketorolac and lidocaine block (mean 5.9 cm vs. 7.4 cm, VAS; $p<.05$), but scores were similar for procedure-related pain, postoperative pain and satisfaction with pain control (90% power to detect 20-mm difference on the VAS) [46]. In another RCT, 94 women undergoing surgical abortion at less than 12 weeks with local anesthesia were allocated to ibuprofen 800 mg PO given 60–90 min preprocedure or ketorolac 60 mg IM 30–60 min preprocedure [65]. Similar pain scores were reported for aspiration, cervical dilation and postoperatively. In addition, the intramuscular injection was itself painful. Overall, the benefit of using intramuscular or intracervical routes of NSAID administration over oral administration has not been demonstrated.

   Finally, Li et al. compared diclofenac sodium 100 mg/misoprostol 400 mcg/lorazepam 1 mg PO to misoprostol 400 mcg/lorazepam 1 mg PO given 4 h preoperatively in 100 women undergoing a surgical abortion at ≤12 weeks without a PCB [66]. Similar scores were reported for intraoperative and postoperative pain and acceptability of pain control. These results did not change in a subanalysis of nulliparous and multiparous women.

8. *Are oral opioids effective for pain control in surgical abortion?*

   Preprocedural oral opioids do not reduce pain from first-trimester surgical abortion under local anesthesia. An RCT compared hydrocodone 10 mg PO and acetaminophen 650 mg PO versus placebo pills 45–90 min preoperatively in 120 women undergoing first-trimester abortion at less than 11 weeks [67]. All women also received local anesthesia, ibuprofen (800 mg PO) and lorazepam (2 mg PO). Similar pain scores were reported during uterine aspiration (mean, 6.6 cm PO sedation vs. 6.3 cm placebo, VAS; $p=.59$). Women in the hydrocodone–acetaminophen group experienced greater postoperative nausea. Pain measured at other procedural time points also was similar between the two groups, and women were not more satisfied with pain management with hydrocodone–acetaminophen. In another RCT of 130 women, oxycodone 10 mg PO and lorazepam 1 mg sublingual given 60 min before uterine aspiration were compared to an IV regimen of fentanyl 100 mcg and midazolam 2 mg [68]. The patients in the IV group had lower intraoperative pain scores (mean, 3.6 cm vs. 6.1 cm, VAS; $p<.001$).

9. *Are oral anxiolytics effective for pain control in surgical abortion?*

   Although oral anxiolytics may decrease anxiety, studies to date have not captured any beneficial effect on pain. One of the earliest studies found that mean pain and anxiety scores in women using an oral anxiolytic (lorazepam 1 mg) preoperatively for first-trimester abortion were similar to placebo group scores [44]. Likewise, in a prospective observational study, sublingual lorazepam 1 mg did not control intraoperative pain better than a PCB alone [19]. Bayer et al. conducted an RCT that enrolled 124 women between 6 0/7 and 10 6/7 weeks to study the effect of midazolam 10 mg PO 30–60 min preprocedure. All participants also received ibuprofen 800 mg PO and a PCB with 1% buffered lidocaine, 20 mL. Women given oral midazolam experienced lower preprocedure anxiety ($p<.001$), but intraoperative pain and anxiety scores were similar [69].

10. *Is inhaled nitrous oxide effective for pain control in surgical abortion?*

    An inhaled mixture of nitrous oxide and oxygen gas (N_2O/O_2) has long been used as an option for outpatient analgesia in other specialties. With the resurgence of N_2O for pain relief during labor in the United States [70,71] and recent U.S. Food

and Drug Administration approval of new equipment to deliver the gas safely, studies evaluating this option for gynecologic procedures in the office are emerging [72]. N_2O reduces pain and anxiety with an onset of action of 2–3 min, and dosing can be titrated from 30% to 70% N_2O. A N_2O concentration of 50% or higher is considered moderate sedation by the American Society of Anesthesiologists [3]. Advantages include quick onset of action with analgesic, anxiolytic and sedative effects and short duration of action. The effects of the gas dissipate within minutes after administration is stopped, and there is no requirement for a ride home in contrast to moderate or deep sedation [73].

Studies to date have not shown that nitrous oxide provides better pain control than placebo during abortion. A French study of 72 women undergoing first-trimester surgical abortion under local anesthesia and intravenous paracetamol determined that nitrous oxide administered in a concentration of 50% controlled pain no better than placebo gas (mean 3.4 cm vs. 3.7 cm, VAS; p=.75) [74]. A US RCT of 140 women compared inhaled nitrous oxide at concentrations of 50% to 70% to lorazepam 1 mg PO and hydrocodone/acetaminophen 5/325 mg PO [75]. In addition, all participants received ibuprofen 800 mg PO and a PCB with buffered 1% lidocaine 20 mL and vasopressin 4 U. Mean pain and satisfaction scores were similar between the groups (mean 5.2 cm N_2O vs. 6.0 cm oral sedation, VAS; p=.09). There are no studies comparing N_2O 70% to NSAIDs and local anesthesia alone.

11. *Are nonpharmacologic options effective?*

Nonpharmacologic interventions can be helpful adjuncts in pain control during first- trimester surgical abortion. Overall, while women appreciate the use of nonpharmacologic adjuncts, data have not shown that they have a significant effect on pain or anxiety. Verbal support techniques ("verbocaine") are often used by providers performing surgical procedures when the patient is awake [2]. Verbal support includes distraction of the patient through conversation, use of gentle language and positive suggestion. Gentle language *avoids* using negatively loaded statements while coaching a patient through a procedure (e.g., instead of telling the patient that an injection of local anesthesia may "sting and burn," say "we are numbing the cervix now to make you more comfortable during the procedure") [75]. While gentle language has not been formally studied in abortion care, it has been shown to reduce pain during local anesthetic injection and venous blood sampling [76,77], although not during colposcopy [78]. Positive suggestion is similar to gentle language but goes further in terms of describing procedural steps in positive ways while bolstering the patient's coping skills (e.g., "that sensation is your cervix gently opening so that the pregnancy can be safely and easily removed" during dilation of the cervix) [2]. An extension of these methods is to have a trained person or doula sit with the patient to provide emotional support during the procedure [79]. One RCT compared doula support to usual care among 214 women undergoing first-trimester surgical abortion [80]. Data showed similar abortion procedure pain scores between the doula group and the usual-care group (mean 6.8 cm vs. 7.0 cm, VAS; p=.52). However, almost all the women (96%) in the doula support arm said they would recommend that doula support be used routinely, and 60% of the women in the usual-care arm stated they would have wanted someone present to provide support during the procedure. The authors speculated that although doula support does not affect the perception of pain per se, it helps women cope with the pain.

Listening to music during the procedure has been studied in surgery and abortion care. In an older RCT, listening to music on headphones (music chosen by subject) was compared to self-administered inhaled methoxyflurane (0.5 volume % with 5 L oxygen per minute) and to no intervention among 144 women having a first-trimester surgical abortion [81]. All three groups received diazepam 10 mg PO 1–2 h preprocedure and a PCB with 1% carbocaine, 20 mL. The percentage of women reporting no or mild pain was higher in the music group (94%) than in the group receiving methoxyflurane (73%) or the control group (80%). More recent studies on music for surgical abortion have not shown an objective benefit in reducing pain [82,83]. In an RCT of 101 women undergoing first-trimester surgical abortion, participants were randomized to music through headphones or to usual care only [83]. All women received ibuprofen 800 mg PO and a 1% lidocaine 20-mL PCB. Pain scores were similar between the music and usual care groups (mean 6.8 cm vs. 6.0 cm VAS; p=.12). Two thirds of subjects in the music group thought the intervention reduced their pain and anxiety, and more than 90% thought that listening to music was a good idea.

Other techniques studied in abortion care include aromatherapy, relaxation exercises, pleasant imagery, analgesic imagery, sensory information and hypnosis. The level of anxiety among women exposed to aromatherapy using the essential oils vetivert, bergamot and geranium (treatment arm) during abortion did not differ from that among women exposed to another pleasant smell (hair conditioner) [84]. In one RCT of 40 women, those who used relaxation exercises (rhythmic breathing), pleasant imagery (beach or mountain) or analgesic imagery (achieve feeling of cold and numbness in hand and transfer to uterus) reported that levels of pain were similar to those reported by a control group who was advised to use a coping strategy that had worked in a previous painful experience [85]. Sensory information, which provides patients with concrete, objective information about the sensations they will experience during a procedure, compared to general information given to a control group also was found to have no effect on procedural anxiety, pain or distress in a study of 84 women [86]. Finally, hypnosis was compared to standard care in a study of 30 women undergoing first-trimester surgical abortion with local anesthesia and administration of 50% N_2O/50% O_2 [87]. Most of the women also received an NSAID and lorazepam, and about one third of the sample had laminaria for cervical ripening. No difference was noted between the two groups in terms of pain or anxiety levels during the abortion; however, a smaller percentage of women in the hypnosis group requested nitrous oxide (36% vs. 87%; p=.008).

Conclusions and recommendations

Level A: Recommendations are based primarily on good and consistent scientific evidence.

1. Preoperative NSAIDs reduce postoperative pain.
2. A 20-mL buffered 1% lidocaine PCB reduces procedure pain.
3. Oral or sublingual lorazepam does not decrease procedural pain but does reduce anxiety.
4. Oral opioids do not reduce procedural pain.
5. Cervical ripening should not be employed solely for pain reduction.
6. Waiting 3 min to allow onset of action for infiltration of anesthesia to the cervix does not improve pain scores.

Level B: Recommendations are based primarily on limited or inconsistent scientific evidence.

1. Verbal support techniques (support person, distraction) and music help women cope with the procedure but do not necessarily reduce pain.
2. Intracervical and paracervical blocks have similar effects

3. Vacuum source (electric vs. manual) does not affect pain scores.
4. Nitrous oxide in a 50/50 mixture does not appear to reduce pain.
5. Atraumatic tenacula are not associated with less pain than single-tooth tenacula.

Level C: Recommendations are based primarily on consensus and expert opinion.

1. A combination of treatments — including NSAIDs, local anesthesia and such nonpharmacologic interventions as verbal support — should be used to reduce pain and improve patient satisfaction during surgical abortion.

Recommendations for future research

- The effect of combinations of modalities on pain experience.
- Patient preferences for pain control methods.
- Alternative modalities for pain management options.
- The relationship between pain perception and satisfaction with the procedure.

Sources

The articles included in this guideline were obtained from a PubMed search of literature from 1966 to 2017 that used the following MeSH terms and text words: induced abortion, surgical abortion, pain, paracervical block, lidocaine, analgesia and anesthesia. The "related articles" search in PubMed was utilized frequently to identify any similar studies omitted on the initial search. The Cochrane Library was searched to identify systematic reviews, meta-analyses and controlled clinical trials. Reference lists of nonsystematic review articles and studies obtained from the initial search were hand-searched to identify articles not yet indexed. Articles not published in English were excluded.

Authorship

These guidelines were prepared by Rebecca H. Allen, MD, MPH, and Rameet Singh, MD, MPH, and were reviewed and approved by the Board of the Society of Family Planning.

Conflict of interest

Rebecca H. Allen, MD, MPH, and Rameet Singh, MD, MPH, report no relevant significant relationships with industry. The Society of Family Planning receives no direct support from pharmaceutical companies or other industries.

Intended audience

This guideline has been developed under the auspices of the Society for Family Planning for its members and for any physicians or advanced-practice clinicians who provide first-trimester surgical abortion services. This guideline may be of interest to other professional groups who care for women undergoing abortion. The purpose of this document is to review the medical literature on pain control for first-trimester surgical abortion. This evidence-based review should guide clinicians, although it is not intended to dictate clinical care.

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